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D. W. BEADLE,

ST. CATHARINES, ONTARIO.

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# The Canadian Horticulturist.

VOL. II.] MAY, 1879. [No. 5.

## ON THE STUDY OF BOTANY.

BY GEORGE MILL, WARWICK, ONT.

In every part of the world mankind depend on fruit trees or the herbs of the field for subsistence to a considerable extent. Plants furnish us with a large part of our clothing, and the principal ingredients of our *materia medica*. Architecture, the mechanical arts, navigation, and almost every branch of industry depend either directly or indirectly on the products of the vegetable kingdom.

As might be supposed, plants, shrubs and trees have been studied by men of intelligence and observation from the earliest times to the present day. In the Holy Scriptures we are told that Solomon "spake of trees, from the cedar tree that is in Lebanon even unto the hyssop that springeth out of the wall;" and "a greater than Solomon" exhorted His followers to "consider the lilies of the field, how they grow."

Among the ancient Greeks we find that Hippocrates, about the year B.C. 409, introduced an enlightened system of medical study, connected with the study of plants. Aristotle, about B. C. 350, wrote a learned work on plants; and his disciple, Theophrastus, about B. C. 300, wrote on the same subject, and described nearly 500 species. The principal botanical writers among the Romans are Pliny the Elder, and Dioscorides, who both flourished towards the end of the first century of the Christian era. In the *materia medica* of Dioscorides about 700 plants are described, and the greater part of our old English herbalists are made up from his writings.

From the time of Pliny the Elder and Dioscorides to the end of the fifteenth century we can say nothing on the state of botany, as history is almost silent on that subject. At the beginning of the sixteenth century Brunsfelsius, a German, published a work called *Historia*

*Plantarum*, which was illustrated with wood-cuts. Although this was quite a step in advance of former writers, yet there was no attempt at classification, without which no branch of natural history can be studied with advantage. The first attempt at arranging plants into classes, orders and genera, was made about the middle of the sixteenth century, by Gesnor, a native of Switzerland. Towards the end of the seventeenth and beginning of the eighteenth century, various systems of classification were proposed in different countries. Tournefort, a Frenchman, whose system depended in a great measure on the corolla, was followed until it was found impracticable. Linnaeus, the great Swedish naturalist, founded what is called the sexual or artificial system of classification. Although this system is by no means perfect, yet it still holds its ground, and has been the means of making the study of systematic botany so fascinating to all classes of people, from the prince to the peasant. A somewhat different, and on the whole a superior method of arrangement has been adopted since the time of Linnaeus, called the natural system. This system takes a more extended and philosophical view of the relations of plants than the system of Linnaeus, and groups them together according to the relationship which plants bear to each other in every part of their structure. A. L. Jussieu, of Paris, may be considered the founder of this system. It has been improved to some extent by Professor De Candolle, of Geneva, and also by Professor Lindley, of London. At the present time, Professor Lindley is our highest authority, both in systematic and physiological botany.

It is scarcely possible to overrate the importance of botany to the horticulturist. The structure and functions of the roots, stems, bark, flowers and leaves must be pretty well understood before we can give sufficient reason for preferring one mode of cultivation to another. There may indeed be a certain measure of success in the different operations of horticulture where there is no acquaintance with vegetable physiology. In like manner the nostrums of a quack, who knows nothing of the structure of the human body, will sometimes be as efficacious as the prescriptions of a scientific medical practitioner. Still it is generally admitted by people of intelligence that a knowledge of anatomy is necessary for medical men, and also that a knowledge of physiological botany is necessary for horticulturists. This is an age of scientific investigation, therefore dogmatical assertions and empirical rules will

not be accepted in horticulture nor anything else. Results must be traced up to causes, and reasons given that will bear close examination.

It is probable that the numerous diseases of fruit trees principally originate in a partial derangement of some part of the tree, consequently if we were sufficiently acquainted with the laws of vegetation we might in a great measure be able to *prevent* these diseases. In speaking of the diseases of plants we generally confine our attention to the agents which produce the diseases, such as aphides, fungi. &c., but it would be well to keep in mind that there are certain conditions in plants, as well as in animals, which render them subject to the attacks of diseases, and just in proportion as we are able to control these conditions we will be able to prevent deseases in plants and trees.

Even as a branch of education to young people of both sexes, the science of botany is invaluable. A botanical ramble in the fields, for the purpose of collecting specimens, or a comparison of the differences and affinities of one species, or one order with another, has a tendency to call into exercise and improve the faculty of observation. When this faculty is wanting, a person will be blind to the works of creation, and unable to derive any pleasure or instruction from the wonders by which he is surrounded. Of such a person it may be truly said

"A primrose by the water brim,
A yellow primrose was to him,
And it was nothing more."

The admirable method of classification in the natural system of botany, drills a young person into systematic habits in other kinds of study. Every one has observed how readily an orderly thinker can master a subject, and also convey information to others, compared with one whose ideas are confused. In the study of botany a person has an inexhaustable fund of refined enjoyment and instruction.

"Not a plant, a leaf, a flower, but contains
A folio-volume. We may read, and read,
And read again, and still find something new—
Something to please, something to instruct
Even in the noisome weed."

A well known gentleman connected with the Fruit Growers' Association has communicated to the writer of this paper the pleasant intelligence that there is a strong desire among certain parties in this Province to have a botanical society. There are no doubt many botanists through the country who would be glad to make the acquaint-

ance of one another, if it could be done. As a means of accomplishing this desirable object, Mr. Beadle, the Secretary of the Fruit Growers' Association, has kindly consented to receive the names and addresses of all parties wishing to form a botanical society. These names will be published in, or on the covers of the CANADIAN HORTICULTURIST, so that it may be ascertained how many are in favor of a society, and also in what parts of the Province they reside. It is to be hoped that all parties who know anything of the science of botany, and who wish to have a botanical society formed in this Province, will send in their names to Mr. Beadle without delay. As one of the principal objects of such a society would be to promote the scientific study of plants, young people of both sexes who have any taste for botany would find it quite an advantage to study in connection with an energetic well managed society.

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## THE QUINCE.

BY EBENEZER DAY, ELORA.

At the last meeting of the Fruit Growers' Association I notice the statement that the quince will grow where the peach will. As some of our members would like to try it, I will give my experience. Some four or five years ago I planted a tree of both quince and peach, more to test their hardiness than in the expectation of seeing them fruit. The quince has received no damage whatever from frosts, and last year it fruited for the first; the year before, it blossomed but did not fruit. The tree was sold to me for Rea's Mammoth. The peach I bought as the Foster; it blossomed the first year I planted it out, but has not since. In the beginning of September of each year I cut it back, leaving from eighteen inches to two feet of the year's growth, but every spring it has been frozen back to within a few inches of the trunk; it makes from three to seven feet growth each year. Both are grown in open ground. Several parties here have tried the peach, but have had no better luck than myself. Don't know of any that have tried the quince, but think that if protected by a house or a close board fence from the north and west, there is not any more difficulty in fruiting the quince than the apple.

# PEACHES.

BY R. HODGINS, ST. CATHARINES.

Having for the last twenty years been a close observer of events in the St. Catharines market, and being especially interested in the kind, quality, and quantity of the fruits offered for sale, I desire to say a few words about peaches, which will, I trust, be interesting to parties who are just now reminded that the season for planting trees is at hand.

About twelve years ago I obtained from the St. Catharines Nurseries a few Early Crawford peach trees for my garden in this city; and from the first year they commenced bearing up to the present time, these trees have not missed a single season in yielding fruit. Last autumn the peaches, though not very numerous, were so enormous in size as to make up in some measure for the comparative failure of the crop.

Now, I have noticed that even in the most plentiful peach years, the Crawfords always found a ready sale in our local markets, at prices ranging from $2.50 to $4 per bushel; while, at the same time, the wretched seedling peaches offered for sale by farmers were sometimes very hard to sell at any price. The trouble with peach growers in this neighborhood is, that many of them depend, in a large measure, on the "chance seedlings" that spring up so freely on their grounds, instead of procuring trees of well known and valuable kinds like the Crawford.

I make these observations solely for the purpose of drawing public attention to this important matter, in hopes that the mistakes of former years may be corrected. It is a shameful fact that many wagon-loads of large peaches grown on the other side of the Niagara River are annually sold in the St. Catharines market at high prices, while our own farmers and fruit growers stand around trying in vain to sell the wretched little seedlings that grow upon trees that cost them nothing, and which in many cases were never planted. Now, let us have a sweeping reform in this peach business. Cut down all the weak and worthless seedling trees; procure good stock, from reliable and responsible dealers, and in a few years we may expect a sufficient supply of good peaches to meet the wants of our own people, without sending large sums of money out of the country to enrich our more enterprising American neighbors.

## RECOLLECTIONS OF A RECENT JOURNEY SOUTH.

BY WM. SAUNDERS, LONDON, ONT.

(Continued from page 67.)

Before leaving Philadelphia I was privileged to visit several very interesting horticultural establishments. At Mt. Airy Nurseries, (Miller & Hayes, proprietors,) there was a large collection of very choice things, especially of evergreens, embracing all the newer and rarer sorts. One feature which was very noticeable here was the great attention paid to individual specimens, giving them sufficient space as well as care, to insure their perfect development, and the retention of their natural beauty of form. There was also a fine collection of the new variegated forms of *Euonymus Japonicus*, and a large space devoted to the out-door culture of Roses, which must look charming when the bushes are in bloom. The proprietors have a number of extensive greenhouses, where plants are largely propagated, and immense quantities of flowers are grown during the winter to supply the city demand for cut flowers; in this department Roses and Carnations have a prominent place.

That veteran horticulturist, Thomas Meehan, was also called on, and many excellent things were seen in his spacious grounds, while his large and varied stock of native trees and shrubs, the culture of which he has made a specialty, is probably unequalled on the continent. Here also in the office of this enthusiastic worker I saw the first portions of that superb work, "The Wild Flowers and Ferns of the United States," which is being edited by Mr. Meehan, and published by Mr. Prang, of Boston. It is issued in parts, each part being illustrated by four beautiful chromo lithographs, representing the plants in their natural colors and in the most artistic manner; the text also is most admirable and instructive reading.

The next stage in the journey was to Washington, where a visit was paid to the Department of Agriculture. Under the care of the very skillful superintendant, Mr. Wm. Saunders, the grounds here have much improved during the past five years. The shrubs and trees, which are arranged in family groups, have attained a fair size, and while they produce good effects as to appearance, they are also invaluable as a means of instruction to visitors. The flower beds about the

building were blooming with Chrysanthemums of many colors, and so relieved by a tasteful arrangement of choice evergreens as to appear quite attractive, notwithstanding that the season for bedding plants was nearly over. Many beautiful varieties of Arbor Vitæ and Retinospora serve an excellent purpose here.

Accompanied by the obliging superintendant, a very pleasant hour was spent in the extensive conservatories among the tropical plants. Here were magnificent Palms from 20 to 30 feet high, and other striking and beautiful objects, but the character of this collection being mainly *economic*, it has an aspect entirely different from that of any where ornament takes precedence of usefulness. Almost every plant, shrub, and tree were useful to man, employed either as food, medicine, in the construction of implements of some sort, or articles of clothing. The ordinary Coffee Tree was represented by fine specimens of luxuriant growth, while alongside were examples of the Liberian Coffee Plant, showing at a glance the striking difference in the character of the foliage, as well as difference of habit, sufficient probably to establish its claims as a variety distinct from the ordinary *Caffea Arabica*. The Tea Plant is largely cultivated, and many thousands of specimens of healthy young plants are annually distributed throughout those portions of the southern States where its culture is likely to prove successful. The reports, especially from some sections in Georgia, are very encouraging; and the area under culture is so rapidly increasing that it is probable that within a very few years a sufficient quantity will be raised in Georgia to supply some considerable portion of the tea demand of the United States. The sight of the various plants and trees which yield farinaceous substances, as well as those producing tropical fruits, was very pleasing, but to me the most interesting feature was the large collection of those which yield medicinal substances. The charming Cinnamon, with its beautiful glossy laurel-like foliage; the large leaved Pimento, fragrant at every pore; the luxuriant Camphor Tree; the Croton Oil Tree, from whose seeds the Croton Oil of commerce is prepared; the climbing vines which yield the Black Pepper and Cubeb Berries of commerce; the Vanilla Plant; the trees which yield Cinchona and Quassia; the Cascarilla and Coca shrubs; the Matico Plant, with its beautifully reticulated leaves; these, with a host of others, which would occupy too much space to mention—all served to make the visit a most delightful one.

Passing through the Smithsonian grounds on the way to the Institute, one could not help being impressed with the beauty and majesty of many of the trees and larger shrubs, which time, supplemented by care, has developed into the most ample proportions.

Leaving Washington in the morning, journeying southward, the country is very flat and uninteresting to the eye; but associated as it is with so many stirring incidents during the late war, a peculiar interest is attached to it. We soon crossed the Rappahannock, and after a time passed through Fredericksburgh, where there was some very severe fighting; in one burial ground visible from the cars there are interred the bodies of ten thousand of the Union soldiers. There seems to be but little improvement in this section of the country; the proportion of land under crop is very small, the untilled acreage must be something wonderful; and it is a rare thing to see a new house anywhere along the road.

Richmond, the city of seven hills, was reached about noon. The view from the high bridge crossing the James River is very beautiful; the city itself is prettily situated, with the advantage of an immense amount of water power adjacent, and seems to be in a thriving condition. But our train hurries on, and passing rapidly through the southern part of Virginia to Danville, the State of North Carolina was entered and the town of Greensboro' reached about 8 p. m., where we lodged for the night.

Early next morning we took train for Atlanta. The portions of North Carolina and South Carolina through which we passed were rather flat, most of the land poor, the soil being of a reddish color, and covered with scrubby undergrowth or small trees. There is a very small proportion of the land under cultivation, and well cultivated farms are "few and far between." The rude log cabins of the negroes are everywhere seen, but there is not much evidence of industry or thrift. Approaching the borders of Georgia, cotton fields were frequently passed, with the negroes here and there engaged in gathering in the third and final picking. The unpicked fields presented a very novel appearance, every plant being decorated with many pure white masses of cotton, which, contrasting with the dark back-ground of the soil, looked as if a snow storm had swept over it, leaving the snow in countless patches. The cotton plant grows from one and a half to two feet or more in height; the seed is planted in rows, the young

plants being thinned out with a hoe, and the weeds subsequently kept down mainly by hand cultivation. The picking is done by the negroes, who work by the job, 50 cents per hundred lbs. being the usual price paid for picking; men, women and children are all engaged more or less in this work in season. The fresh picked cotton, containing all the seed imbedded in it, is taken to the cotton gins, where it is cleansed from the seed; the operator taking one-fifteenth part of the cotton and seed for his pay. At these establishments the cotton is also pressed and packed in bales ready for shipment. The seed, which contains a great deal of oil, is sent in large quantities to various cities in the Union, where the oil is pressed out. There is also a large amount exported to foreign countries for the same purpose; but the seed being produced much in excess of any demand, either domestic or foreign, the greater portion of the crop is used as a fertilizer. To prepare it for this purpose it is fermented in heaps, and when decomposed is mixed with phosphates. The soil enriched with this mixture is rendered much more fertile, and the succeeding crop heavier in proportion.

Next in importance to cotton is corn, which is very extensively grown, and forms the staple food of the poorer class of the inhabitants, both white and black. There are also some very large sheep farms in this neighborhood; the parties engaged in such enterprises usually own large tracts of land, and as the animals need no shelter during the winter, they only see their sheep as a whole once a year, when they are brought together to be sheared and branded.

Although not related in any way to horticulture, I cannot forbear a reference to the mineral productions of the northern portions of these States, which are very interesting. Gold and copper is found in many places along the line. Near Charlotte, a town of 10,000 inhabitants, near the centre of the southern margin of North Carolina, we saw a number of small pits, where the negroes had been washing the earth for gold, which had been brought to the surface by the recent rains. Both gold and copper mines are now being profitably worked here. Precious stones are also found in this district; Corundum, and its sub-varieties, Sapphire, Ruby, Hyacinth, and Topaz; Diamonds also are occasionally picked up. One of the most remarkable mineral products is Stracolumonite, or elastic sandstone, which admits of being considerably bent without breaking; it is in a laminated form, the layers easily

separable; this substance has thus far been found no where else in the world.

At Central, a small refreshment station near the dividing line between South Carolina and Georgia, a row of curious looking trees adjacent to the station attracted our attention. On examination they proved to be specimens of the Winged Elm, *Ulmus alata,* the branches of which were all winged on each side with a very peculiar looking flat outgrowth of the bark and woody tissue, giving the leafless trees a very singular look.

At 10 o'clock that evening we reached Atlanta, Ga.

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## THE THORN, "WHOSE END IS TO BE BURNED."

BY A FELLOW WORKER.

BOY.—Dear mother, you said t'other day, it was plain
That God, Who made all things, made nothing in vain;
Now, if it be so, will you say if you please,
Did God make those thorns on our blackberry trees?
Picking fruit once with Pat, he swore at the thorn,
And wished the inventor had never been born:
He said naughty words, that I don't like to tell,
And said, he believed that all thorns came from hell.

MOTHER.—Your questions, dear Charles, are indeed very queer,
To answer them plainly, not easy I fear:
Our Bible informs us, thorns came through our sin;
No thorns were in Eden ere sin entered in.
And the land bearing thorns rejected shall be,
And thorns shall be burned in the end, you will see.

BOY.—If so, I'm resolved what I'll do in the spring,
From the woods, and the swamps, to our garden I'll bring
Thornless bushes, and plants of various sorts,
And there I will watch all their freaks and their sports.
The plants bearing thorns by the thornless shall grow;
The seed from the thornless I'll gather and sow;
Then the strong thornless plant that good fruit shall bear,
Shall be nurtured, and cultured, and tended with care:
But the plants bearing thorns rejected shall be,
And then, picking berries, what fun we will see.

## ESOPUS SPITZENBURGH AND NORTHERN SPY.

BY REV. R. BURNET, LONDON.

The Esopus Spitzenburgh is the king of apples—the apple of apples. In flavor it holds much the same relation to apples as the Seckel does among pears. We are strongly inclined to think that it has the highest and most distinctive apple flavor there is. With all its distinctness there is nothing harsh about it; it is a truly delicious apple. Its origin is not obscure. It arose on the Hudson, at Esopus, a noted apple district inhabited by low Dutch, and has gradually secured for itself a very wide diffusion, being universally esteemed. Downing declares that all good judges of fruit consider it equal to the Newtown Pippin. Any apple comparable to the Newtown Pippin is worthy of consideration, for it is a superb apple. The Esopus Spitzenburgh, however, has merits all its own. In some districts it thrives splendidly, in some others it does not do so well. I have seen it spot badly in places, elsewhere it has been all that could be desired.

Grimsby seems a welcome soil for its production; in Walsingham it attains a large size; at Normandale it cannot be beat. After all said and done, however, the tree is a rather puny grower, and when old the shoots are slender, and the limbs pendulous. At Virgil it thrives exceedingly well, and yields fairly; as a rule, however, throughout the country it is not prolific; and while the best dessert fruit there is, it cannot be said to be for the millions.

The size is large, deep red, with gray spots, and delicately coated with bloom; flesh yellow, crisp, indicating the *fraiche* of the French, rich and excellent, and a delicious brisk flavor. It should have a place in every amateur and farmer's orchard. Its quality exceeds its quantity. Ready to eat in December; it will keep readily till May. We question if there be a finer cooker than the Esopus. Its quality as a dessert fruit stands A 1, and as a winter cooking apple it cannot be excelled.

Ellwanger & Barry state, in reference to the Northern Spy, that it is "one of the finest late keeping apples." This is no mean praise, and well deserved. Few apples have so rapidly gained in public favor as the Northern Spy has done. It has peculiarities all its own. The fruit is large to very large, is beautifully striped, and quite covered on the sunny side with deep crimson, and delicately covered with bloom.

The flesh is juicy, rich, and highly aromatic, retaining its freshness of flavor and appearance till July. We have just opened a barrel of these delicious apples, grown and presented by Mr. Ed. Lutz, of Stoney Creek, (30th January,) they are in fine order, and but for their enormous size would be considered delicious dess rt. It is styled "winter dessert." Out of curiosity I had some of them baked. They cook splendidly, and thus preserve the good characteristics of their pomological associates. At Wellington Square Mr. Springer has a magnificent orchard of this variety, and finds they do well.

One strong recommendation to the planting of the Northern Spy is, that leaf and blossom buds open a week later than other varieties. This peculiarity almost always secures a good crop of fruit, inasmuch as the cold and trying weather that checks and destroys other varieties has passed before the "Spy" puts in appearance. Generous cultivation must be accorded to this sort, and as the tree is a rapid and upright grower, the branches need occasional thinning. As a market variety this can scarcely be excelled. It carries well, and gives the utmost satisfaction, both to grower and purchaser. A single orchard of this variety will amply repay the care and outlay of the cultivator. We ought to add, that here and there we have seen it spot. Good cultivation and dry soil are congenial to its growth, and are the grand remedies. It is a splendid variety, and would have a place in any collection of twenty varieties.

## AN ENEMY AMONG THE GOOSEBERRIES.

BY H. M. SWITZER, PALERMO.

The gooseberry is a favorite fruit of mine, and which in my garden I have raised to perfection until the last two years. I am very anxious to apply a remedy if I knew of one, and I thought that you would likely know, and, through our little welcome and useful monthly, diffuse such information that I would be able, with others similarly situated, to overcome the cause which deprives us of ripe delicious gooseberries. Shortly after picking the berries for canning, I notice on those left to ripen, a tiny dark spot, as if punctured; changing rapidly round it the green surface into a dull white, which soon assumes a brownish color, and before the berry is ripe drops from the bushes. On examnation, I

found a small maggot, a germ I suppose of some little rascal who comes to disappoint me in realizing a rich repast on my expectant ripe gooseberries. Now, Mr. Editor, can you tell me what it is? how to banish it? is there any cure? Is the little rebel a thief of the night, or is he a tramp of day light, using the light of the sun to rob me of my fruit? If you can give me any information that may be the means of conquering the nuisance, I pledge you I will endeavor to master it. Nothing else touches the fruit, no mildew or any other thing but the gooseberry worm, and that chap with me has a pretty hard time.

NOTE BY THE EDITOR.—We have not been favored by a visit from this little depredator, and having never seen him nor his ravages, can only suggest that if he begins his nefarious work this summer, that our correspondent send a few of the berries to W. Saunders, London, President of the Entomological Society, for examination. In the meantime we shall be very happy to publish any information that any of our friends may have to give on this matter.

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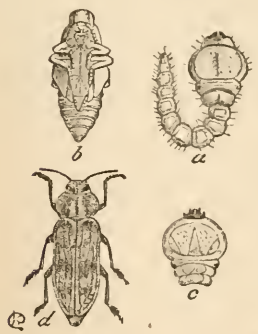
## HORTICULTURAL GOSSIP. VII.

BY L. WOOLVERTON, M. A., GRIMSBY.

THE BORER.—On cutting down an old tree of about seventy years of age, I was astonished to find what ravages the Borer (*Chrysobothris femorata*) had been making in its trunk. No evidence of its presence had been seen outside. No cause could previously be given of the gradual decline of the tree, except that it was getting old; yet older trees standing near were still vigorous. But here was revealed the whole secret, for the trunk, from the bark to the heart, was ramified with tunnels made by the larva of the Buprestis Beetle. It was easily distinguished from the Two-striped Borer, (*Saperda Bivittata*,)—which also attacks the apple tree—by its flattened form, and enormous enlargement of the prothoracic ring, which gives it the appearance of having a huge head, while the larva of the latter is nearly cylindrical, short and fleshy. This genus of Buprestidae, which infest the apple and oak, (see Dr. Packard's



guide to the study of insects,) is greenish black above, with a brassy polish; it is by no means so beautiful as many other genera of this family; indeed, its dark color and rough surface enable it to easily escape the notice of the observer. It lives but one year in its larval condition, while the two-striped Borer infests the tree in that state for the space of two or three years.

The discovery of these unsuspected ravages naturally arouses vigilance in the protection of other trees; and it points to much neglect during the several seasons past, in omitting the mid-summer application of soft soap and water to the trunks; having been deluded into the belief that this enemy was few in number, when in truth it was unusually abundant. We would therefore warn our fellow apple growers not to omit the annual washing of the trunks of all their apple trees, lest this insidious foe impair their vigor before his presence is even suspected. (For further valuable information concerning these beetles, we would refer the reader to the Report of the Fruit Growers' Association, 1870, pages 70, 71.)

The Woodpecker is one of our friends, but I am yet to be persuaded that he is faultless, although many of our best authorities declare he does no mischief whatever. I have to accuse him of overdoing his work on our Early Harvest apple trees. It seems as if the sap of that variety at least must attract him, notwithstanding the assertion that he is not a sap sucker, but only an insect hunter. He has done no harm whatever to any other kind of apple tree, but many a large branch of this variety has been so completely girdled by their peck-holes, that it has turned black and died. But we do not wish to accuse him too harshly, for it is better to lose a good many branches through his friendly labors than whole trees by the devastation of borers, of which he is a greedy devourer. He pecks holes in the trees by means of his long wedge-shaped bill, and into these he thrusts his long tongue in search of insects; these he captures by means of a glutinous secretion, with which the tongue is new coated each time it is drawn in; or in case of large insects, by means of the barbed reverse filaments upon its horny tip.

The family (*Picidae*) includes hundreds of species, of which perhaps the more common among us are the Downy Woodpecker, (*Picus pubescens.*) which is about six inches long, and twelve from tip to tip of its wings; and the Hairy Woodpecker, (*Picus villosus,*)

which is much larger. The latter is black above, with a white band down the middle of its back, and two white stripes on each side of its head, in addition to which the male has a scarlet crest. Both these are commonly called sap-suckers, which is considered an unmerited title.

THE MOUSE.—In "Notes on the Mouse," I stated that I believed the species *Arvicola riparius* to be the most common kind found in the orchards of the Canadian fruit grower. Perhaps this may not be the case everywhere in Ontario, but in our own section, (Lincoln County,) it is certainly one of the most numerous species. To make sure about the matter, I sent some specimens for identification to Prof. R. Ramsay Wright, of the University College, Toronto, whose kindness in this respect I have before acknowledged. They were captured in the orchard, under some corn stalks, where they had made their nests and gathered a store for their young; but whence they were ready to make predatory excursions among the trees. The tail is very short, giving rise to their common name, "the Short-tailed Meadow Mouse." Prof. Wright says: The (first) specimens belong to the species *Arvicola riparius*; order, meadow mouse. These seem to agree well with the long haired variety (*longipilis*) described by Baird, which is perhaps only the winter dress. The tail is a trifle shorter in proportion to the length of the body than Baird describes. He mentions that species of the genus have proved destructive in America to young trees, but does not specify any one in particular. Prof. Wright also refers to Dr. Cone's monograph of the Rodentia for more detailed information; and adds that he will gladly render any further service in the identification of Canadian specimens of natural history.

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## EFFECTS OF FROST ON PLANTS AND SOILS.

BY P. E. BUCKE, OTTAWA.

The past summer season has not been the brightest on record for the fruit cultivator of this section. The winter of 1877-8 was marked by an unusually small snow-fall, and the consequence was that our cultivated raspberries suffered very severely, and especially Brinkle's Orange, which proved almost a total failure. I may remark *en passant* that though this plant is one of the most delicate of the raspberry class, it stands the climate here about as well as the hybrid or moss

roses when there is a good protection of snow on the ground. The Brinkle's Orange berry is considered to be one of the most delicate flavored of fruits, and is highly remunerative when it does well, the berries selling readily for twenty cents per quart; it requires, however, a convenient market, as it is too soft to carry far. The reds also suffered more or less, and even the Philadelphia was a good deal frost-bitten.

The action of the frost downwards as well as upwards is very peculiar, and it may not be uninteresting to mention a curious fact, which may account for some of the oddities of the vegetable nature. At the end of last August, Mr. Greenfield, of this city, had a Transcendant Crab tree which was apparently in the last stages of existence; in order that he might ascertain the cause of its coming end, he set himself to work to remove the soil very carefully, so as to get at the root of the evil and the roots of his tree at the same time. He was much astonished to find that the severe frost, which almost every one has observed to heave fence-posts, &c., had heaved his tree, and had broken off the small roots or spongioles, so that the tree was unable to assimilate its food, and, like a starving man, died of inanition. This examination has to my mind let in a flood of light on those diseases called "blight," and I feel certain a number of trees might be annually saved from a premature death by the application of a heavy mulch. It also shews conclusively how it is that all trees pass through the severest winters when there is a large amount of snow fall, especially if that snow remains on the ground well into spring A heavy coating of the "beautiful snow" when it comes early, not only keeps the frost from entering the ground, but should the soil be frozen before it arrives, it keeps more from taking effect; and the warmth of mother earth or the capillary attraction which draws the water from below towards the surface, which is constantlly going on, keeps continually reducing the crust from the underneath side, and when spring appears little or no frost is to be found. I have seen a fall of two inches of snow protect ground from six degrees below zero of frost; so that a pliant cane walking-stick could be readly thrust into the earth. There is at the time of writing four feet of snow on the level about here, and there has been good snow roads since the middle of November, consequently if we have anything like an ordinary spring, we anticipate a first class yield of fruits, especially of the strawberry, next season.

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